

REMARKS

The foregoing amendments and these remarks are in response to the Office Action dated March 12, 2003. This response is timely filed within the three month shortened statutory period for responding. Accordingly no extension of time and no fee is required.

At the time of the Office Action was issue, claims 1-23 were pending in this application. Claims 1-5, 8-9 and 12 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,452,549 to Lo ("Lo"). Claims 6-7, 13-15 and 18 were rejected under 35 U.S.C. § 103(a) as being obvious based on Lo in view of U.S. Patent No. 6,483,481 to Sievenpiper et al ("Sievenpiper et al"). Claims 10-11 and 19-22 were rejected under 35 U.S.C. 103(a) as being obvious based on Lo in view of U.S. patent No. 6,512,487 in view of Taylor et al. (Taylor et al.). Claims 16-17 and 23 were rejected as being obvious based on Lo in view of Sievenpiper et al., and Taylor et al. Claim 1 has now been amended and claim 3 has been canceled.

Prior to addressing the Examiner's rejections on art, a brief review of applicants' invention is appropriate. Briefly, the invention concerns an array of radiating elements which include a first and second plurality of antenna elements in an array configuration. The first plurality of radiating elements is configured for operating on a first band of frequencies. The second plurality of antenna elements is also in an array configuration but is configured for operating on a second band of frequencies. Further, the first plurality of antenna elements is advantageously positioned below the second plurality of antenna elements so as to act as an effective ground plane for the second plurality of antenna elements.

As recited in amended claim 1, the first and second frequency bands are adjacent to one another so as to allow the array to function essentially as a single wideband array covering both bands. The lower frequency range of the high frequency elements can begin approximately where the response of the low frequency antenna elements cuts off. This provides the antenna array system with a wider continuous bandwidth than an array formed from a single type of antenna element.

As recited in independent claim 13, the invention can advantageously make use of two sets of feed organizers for communicating RF respectively to the first and second arrays. These two sets of feed organizers are arranged in a common grid pattern with the second set of feed organizers forming a grid pattern interposed on the common grid pattern. Finally, independent claim 19 recites the inclusion of interdigitated antenna elements which offer inherently broadband performance.

Turning now to the Examiner's rejections on art, applicants note that the Examiner has rejected claims 1-5, 8-9 and 12 under 35 U.S.C. § 102 (e) based on the Lo reference. Lo teaches stacked arrays of radiating elements in which a first array of high frequency elements can act as a ground plane for a second array of low frequency elements. According to Lo, the two bands can have a frequency ratio of as little as 4:1. This is significant because the frequency bands in Lo are still well separated.

By comparison, in applicants' invention as recited in amended claim 1, the first and second arrays have operating frequency bands that are actually adjacent to one another. This means that the frequency ratio as between the two bands in applicants' invention can be considerably smaller than the 4:1 limit set forth in Lo. The adjacent positioning of the frequency bands in applicants' invention allows applicants' array to provide practically continuous frequency coverage over an exceptionally wide frequency

range in a single compact package. The effect is enhanced where interdigitated radiating elements are used.

Claims 6-7, 13-15 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lo in view of Sievenpiper et al. However, Sievenpiper et al. does not disclose an array of antenna elements or any corresponding set of antenna element feed organizers at all. Instead, Sievenpiper is merely a high impedance surface that has a plurality of conductive metal plates with associated connections to a ground plane. Consequently, Sievenpiper does not make up for the deficiencies of Lo. Sievenpiper does not reasonably disclose or suggest applicants' arrangement of stacked arrays of antenna elements, array ground planes, and adjacent frequency bands, to achieve continuous antenna performance over a very wide range of frequencies. Further, it does not reasonably suggest that in the context of the stacked arrays of applicants' invention, with the second grid pattern rotated relative to the first grid pattern, that a common grid pattern could be used for the antenna feed organizers for both sets of antenna elements.

Claims 10-11 and 19-22 were rejected under 35 U.S.C. § 103(a) based on Lo in view of Taylor et al. Similarly, claims 16-17 were rejected under 35 U.S.C. § 103(a) based on Lo in view Sievenpiper et al. and further in view of Taylor et al. However, Taylor et al. is subject to the statutory exclusion under 35 U.S.C. § 103(c) since it would only qualify as prior art under 35 U.S.C. § 102(e) and it is owned by the same entity (Harris Corporation). Accordingly, the rejections of claims 10-11, 16-17, and 19-22 are believed to be improper.

For all the foregoing reasons, claims 1-2 and 4-23 are believed to be patentable.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,

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